LINKING HOUSING, INFRASTRUCTURE, AND INCOME AMONG PVTGS IN JHARKHAND: A CORRELATION AND FACTOR ANALYSIS APPROACH

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Abstract
This study investigates the interconnected dimensions of housing, sanitation, landholding, and income among Particularly Vulnerable Tribal Groups (PVTGs) in the Latehar district of Jharkhand. Significant differences in access to key infrastructure are uncovered through the use of correlation and factor analysis. Although there is a significant mean ownership of property, the uneven distribution of land ownership underlines the existence of internal inequities. There is a high correlation between income and key structural variables such as pucca housing and the number of rooms, although sanitation and utility access continue to be severely lacking. The results of the factor analysis show that there are two fundamental dimensions: structural well-being and indoor utilities. This demonstrates that deprivation comprises both elements that are functional and those that are physical. In light of these findings, it is clear that development methods that are more integrated and responsive to context are required.

Keywords*: Particularly Vulnerable Tribal Groups (PVTGs); Housing Infrastructure; Sanitation; Correlation Analysis; Factor Analysis; Jharkhand; landholdings*

1. Introduction

Access to basic infrastructure, like decent housing, toilets, clean water, power, and land, is a basic requirement for human dignity and well-being. However, these basic needs are still hard for India's Particularly Vulnerable Tribal Groups (PVTGs) to get to. The Indian government came up with the idea of the PVTG category in 1975. It includes tribal villages that don't have access to modern farming technology, don't have many educated adults, have populations that stay the same or go down, and aren't very connected to the rest of the economy. In India, 75 PVTGs have been found in 18 states and one union territory as of 2024 (Ministry of Tribal Affairs). They are some of the most disadvantaged groups in the country.

In Jharkhand, where nearly 26.21% of the population is tribal (Census, 2011), there are eight PVTG communities, including the Birjiya and Korwa tribes. Even with several constitutional and programmatic safeguards, including the Pradhan Mantri Awas Yojana (Gramin), the Forest Rights Act (2006), and the Development Action Plan for Scheduled Tribes (DAPST), many communities still lack proper access to basic infrastructure. Due to administrative and logistical difficulties, money usage under many tribal welfare programs is still low in remote tribal belts, according to statistics from the Ministry of Tribal Affairs for 2023–2024.

The results of recent surveys paint a clear picture. Just 58.9% of Scheduled Tribes in rural regions have access to restrooms, according to NFHS-5 (2019–21). In addition, 34% of Jharkhand households lack access to better sanitary services. The percentage of buildings with piped water access is still 13%. In Jharkhand, less than 43% of households reside in pucca houses, indicating a similarly severe housing shortage. Due to a combination of socio-economic and geographic marginalization, limited administrative reach, and lack of formal property ownership, PVTGs continue to be marginalized in infrastructure development despite policy attention. This study explores these gaps at the micro level by analysing the kind and degree of deprivation in housing, sanitation, and land access using field data from the Korwa and Birjiya communities in Jharkhand. The study intends to inform localized, community-sensitive policy actions and provide a more nuanced understanding of tribal infrastructure shortages by firmly establishing the analysis in actual reality.

2. Review of Literature

The infrastructural marginalization of Particularly Vulnerable Tribal Groups (PVTGs) in India remains a pressing concern. They are still denied access to basic infrastructure, such as housing, water, electricity, sanitation, and land, even after targeted programs have been put in place. Recent research indicates that community-focused studies are required because large-scale programs usually ignore the micro realities of these groups (Ambagudsia & Xaxa, 2022). These communities' pre-agricultural lifestyles, low literacy rates, subsistence-level economies, and remote locations all contribute to their social and economic vulnerabilities (Xaxa & Devy, 2021).

2.1. Conditions of Housing and Facade Design

Housing serves as a primary indicator of infrastructure deprivation. Over fifty percent of the Scheduled Tribe people resided in non-permanent dwellings, indicating ongoing material deprivation in eastern Uttar Pradesh (Singh Kharwar et al., 2024). Field data from Jharkhand corroborates that 43.9% of surveyed families inhabit comparable houses. A sizable portion of PVTG households live in kaccha buildings made of bamboo, mud, and thatch, which are prone to collapsing in extreme weather. The significance of facade design, although little examined in tribal literature, is increasingly recognized for its indirect influence on livelihoods. Houses with improved roofing and facades often engaged in a wider variety of informal economic activities, according to a study conducted in Karnataka's PVTG communities. A durable, aesthetically pleasing facade can maintain household dignity, enhance safety, and make home-based business operations easier. (Singh et al., 2023). These elements possess both symbolic and functional importance in indigenous housing.

2.2 Sanitation Access

Cultural practices, limited awareness, and infrastructural obstacles have also contributed to the delay in the adoption of sanitation among tribal groups such as the Irula in Tamil Nadu (Lakshmi & Eswarappa, 2024). Women and the elderly are particularly impacted by the absence of restrooms, which not only reduces safety but also increases health burdens, in addition to physical inconvenience. PVTG regions continue to suffer from a severe deficiency in sanitation infrastructure. Implementation is impeded by geographic isolation and a lack of follow-up in remote regions, despite substantial investment through initiatives such as the Swachh Bharat Abhiyan. There was a widespread prevalence of open defecation and inadequate refuse disposal, resulting in unsafe and undignified conditions as revealed by other field investigations conducted in tribal belts (Bhoi & Acharya, 2024).

2.3 Drinking Water Access

In these circumstances, water shortage exacerbates existing gender responsibilities, as women bear the primary responsibility for collection (Awunyo-Akaba et al., 2016).

Field evidence indicates that more than 92% of houses rely on outside hand pumps, showing that the source of safe and accessible drinking water in PVTG settlements is very inadequate. This phenomenon is not exclusive to Jharkhand; other tribal-majority states exhibit analogous trends, with piped water largely inaccessible to the majority (Singh Kharwar et al., 2024).

Particularly Vulnerable Tribal Groups (PVTGs) in Orissa depend significantly on seasonal water supplies and open wells, which frequently become contaminated or dry during the summer months (Bhattacharjee et al.). In these circumstances, water shortage exacerbates existing gender responsibilities, as women bear the primary responsibility for collection. Hand pumps, although common, present difficulties in rocky or arid regions and can necessitate considerable physical exertion (Awunyo-Akaba et al., 2016).

2.4 Electricity and Livelihoods

Access to electricity in Particularly Vulnerable Tribal Groups (PVTG) regions is inconsistent and unpredictable. A minimal number of homes had access to both tap water and electricity, constraining their capacity to engage in contemporary education or economic prospects in the area examined. The inconsistent electricity disrupts the operations of self-help groups and digital financial inclusion in PVTG regions, highlighted by a study in Karnatka (Singh et al., 2023). Lack of power hampers basic refrigeration, lighting, and cell connectivity, consequently exacerbating digital and economic disparities. The previous research indicates that energy shortages hinder household output and limit children's study hours in tribal regions (Kumar & Mishra, 2019).

2.5 Land Ownership and Livelihood Security

Secure land tenure is essential for the sustainability of livelihoods and housing privileges for PVTGs. Nevertheless, landlessness and the absence of formal documentation are prevalent concerns. A significant number of households either occupy forest land without legal titles or are involved in unresolved tenancy disputes, as revealed by several studies. Access to housing subsidies, credit, and welfare programs is impeded by these obstacles.

Studies conducted in the Keonjhar district of Odisha have demonstrated that insecurity is a consequence of delays in implementation and administrative impediments, even when rights under the Forest Rights Act are acknowledged (Valencia, 2021). PVTGs' land rights in Chhattisgarh revealed that over 60% of claims were either pending or rejected as a result of documentation deficiencies (Singh, 2017). This lack of official ownership weakens economic stability and prolongs poverty across generations.

3. Need for Localized, Community-Specific Studies

The localized approaches, facilitated by community engagement, resulted in improved outcomes as per the health and nutrition studies in Odisha (Bhattacharjee et al.). Macro-level surveys, while revealing underlying patterns, can conceal internal

diversity within tribal groups. The lived experiences of PVTGs are influenced by distinct cultural, regional, and economic factors that defy generalization (Ambagudia & Xaxa, 2022). A micro-level study enhances the growing focus on contextualized knowledge by examining the Korwa and Birjiya communities in Jharkhand. For developing effective infrastructure and policy frameworks for PVTGs, micro-level viewpoints are necessary.

4. Objectives of the Study

With an emphasis on Korwa and Birjiya, this study aims to explore the nature of infrastructure deprivation among Particularly Vulnerable Tribal Groups (PVTGs).

The specific objectives are:

1. To assess the status of housing and basic infrastructure access
2. To analyze the Interlinkages between components of housing structure, sanitation, land holding, and income.

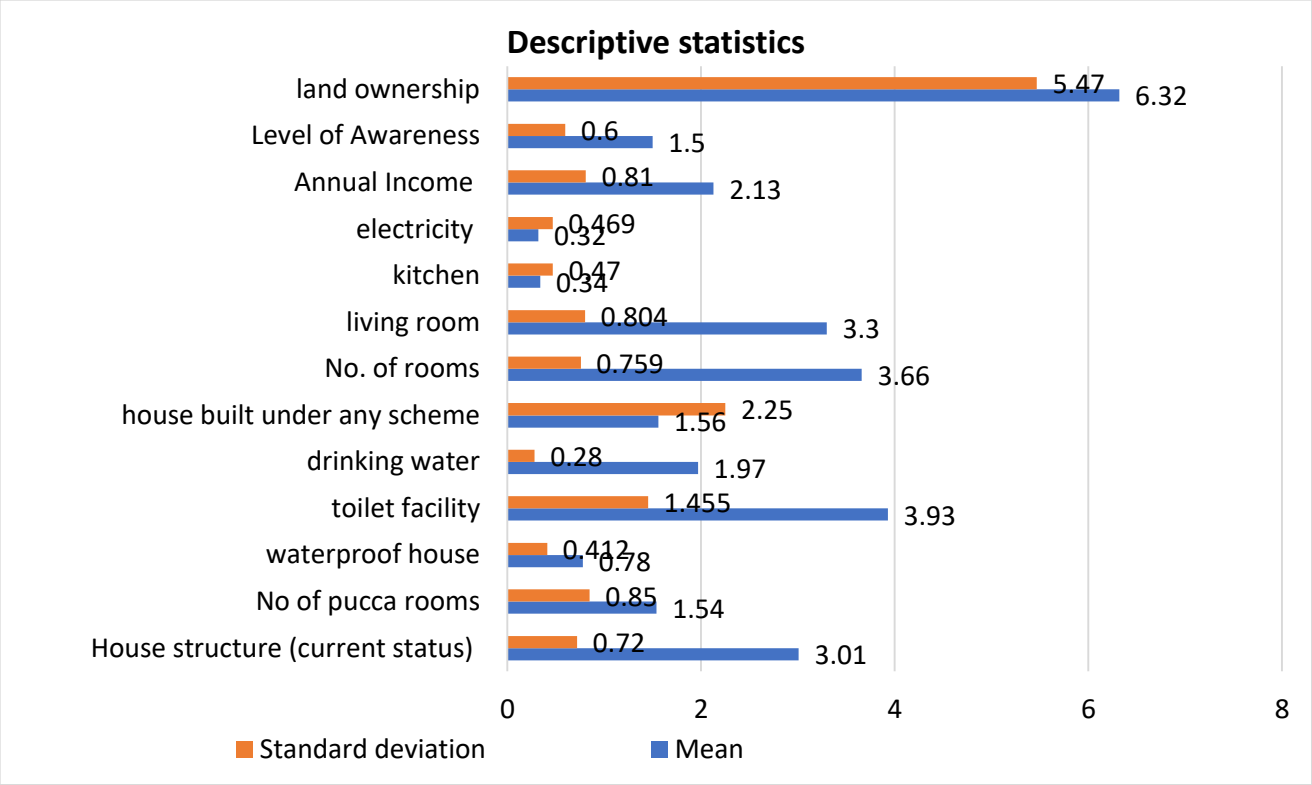
5. Methodology

This study adopts a micro-level exploratory approach to examine access to land, housing, and sanitation among Particularly Vulnerable Tribal Groups (PVTGs) in the Latehar district of Jharkhand. A structured questionnaire was used to get information from 75 households in the Korwa and Birjiya communities. The questions asked about things like land ownership, building type, sanitation, access to electricity and drinking water, income level, and knowledge. In addition to the main data, informal observations made in the field were used to help understand the context. We also used informal field observations to add to the main data. We used STATA to analyze four steps. First, descriptive statistics (mean and variance) were used to make a baseline profile of the infrastructural and socio-economic variables. Second, a pairwise correlation matrix and significance tests (p-values) were utilized to find connections between important factors, including pucca rooms, kitchens, electricity, and income. Third, we used principal factor analysis to make the data less complicated and find hidden factors. A likelihood ratio test ($\chi^2 = 683.60$, df = 78, $p < 0.001$) confirmed that the model was correct and that factor analysis was the right method to use. Two main factors were found: one had to do with housing and economic well-being, and the other had to do with infrastructure and access to utilities. Finally, the information from the analysis above was utilized to make policy suggestions that were tailored to the specific needs of PVTG households when it comes to infrastructure.

6. Findings

6.1 Status of Housing and Other Basic infrastructure

The bar graph 1 below shows important differences in the infrastructure and living conditions of the families that were surveyed, showing both areas with a lot of resources and areas that don't have enough. With a mean value of 6.32, land ownership stands out as the most valuable asset. However, the big standard deviation (5.47) shows that land is not distributed equally. The mean score for access to toilets is pretty high (3.93), but the large range (SD 1.45) shows that cleaning coverage isn't always the same. On the other hand, everyone still doesn't have access to basic amenities like power (mean 0.32) and kitchen facilities (mean 0.34), which shows that infrastructure isn't being taken care of properly. Indicators of housing, such as the number of rooms (3.66), the general structure of the house (3.01), and participation in government housing schemes (2.25), show moderate averages. However, the wide range of values shows that policies and programs are not reaching all areas equally. These results show how important it is to act quickly to make sure that everyone has equal access to basic services and decent living conditions, especially in areas that are already struggling or are at risk.



Source: Author's Estimation

Figure 1: Descriptive statistics

6.2 Interlinkages between components of housing structure, sanitation, land holding, and income.

Table 1: Correlation matrix

	House structure	No of pucca rooms	waterproof house	toilet facility	drinking water	house built under any	No. of rooms	living room	kitchen	electricity	Annual Income	Level of Awareness	land ownership
House structure	1												
No of pucca rooms	0.248273611	1											
waterproof house	0.190200827	0.944100126	1										
toilet facility	-0.20387327	-0.4462392	-0.3392919	1									
drinking water	0.067427121	-0.0503231	-0.0493169	0.356017418	1								

							1
						1	0.036291535
					1	0.4970618	0.087652557
				1	0.347736435	0.135932539	0.180374485
			1	-0.19939944	-0.05101073	-0.05504685	-0.02740599
		1	-0.38450791	0.308869095	0.578266127	0.28892586	0.103148919
	1	0.810677021	0.210488914	0.189480957	0.599835879	0.286152506	0.084511711
1	-0.52863935	-0.38614445	-0.16956439	-0.26076534	-0.41814766	-0.25192501	-0.14382835
0.213881273	0.020926548	0.09554503	-0.13000915	-0.13805179	0.01567531	-0.15752641	0.022985557
0.139173787	-0.22831483	-0.1553791	-0.10209241	0.051419159	-0.12979368	-0.16169078	-0.16521846
-0.45091574	0.546591179	0.362560614	0.310945065	0.008372705	0.490240248	0.332823525	0.270023541
-0.40430968	0.490398857	0.281996358	0.354233711	-0.07102848	0.417784357	0.241471962	0.321511915
0.011885939	0.253359988	0.06229495	0.297398309	-0.21090822	0.088769318	0.108180041	-0.23231524
house built under any	**No. of rooms**	**living room**	**kitchen**	**electricity**	**Annual Income**	**Level of Awareness**	**land ownership**

Source: Author's Estimation

The correlation matrix above (Table 1) indicates associations among the housing and infrastructure parameters of PVTG households. The number of pucca rooms and waterproof homes shows a strong and positive correlation (r = 0.94), indicating that homes with sound structural integrity are more likely to withstand weather. The number of rooms is positively correlated with household income (r = 0.60) and waterproof housing (r = 0.55), suggesting that large, well-built homes are often associated with higher economic status.

A favourable correlation exists between annual income and the presence of a living room (r = 0.58) as well as the level of awareness (r = 0.50), highlighting the influence of economic capital on enhancing household amenities and knowledge. A negative association exists between toilet facilities and pucca rooms (r = –0.45) as well as waterproof housing (r = –0.34), indicating that access to sanitation is constrained even in comparatively superior dwellings. Variables such as pucca rooms (r = –0.40) and waterproof housing (r = –0.45) show negative associations with houses built under government plans, suggesting potential quality issues or targeting discrepancies.

The infrastructure indicators are interrelated, with awareness, housing quality, and income all playing a crucial role in facilitating better living conditions for the evaluated PVTG households, as shown by the result.

Table 2: Significant correlations among housing and infrastructure variables

Variable Pair	Correlation (r)	p-value
House structure – Pucca rooms	0.25	0.032
House structure – No. of rooms	0.25	0.028
House structure – Kitchen	0.30	0.010
House structure – Land ownership	–0.23	0.045
Pucca rooms – Waterproof house	0.94	0.000
Pucca rooms – Toilet facility	–0.45	0.000
Pucca rooms – House under scheme	–0.40	0.000
Pucca rooms – No. of rooms	0.49	0.000
Pucca rooms – Living room	0.28	0.014
Pucca rooms – Kitchen	0.35	0.002
Pucca rooms – Income	0.42	0.000
Pucca rooms – Awareness	0.24	0.037
Pucca rooms – Land ownership	0.32	0.005
Waterproof house – Toilet facility	–0.34	0.003
Waterproof house – Under scheme	–0.45	0.000
Waterproof house – No. of rooms	0.55	0.000
Waterproof house – Living room	0.36	0.001
Waterproof house – Kitchen	0.31	0.007
Waterproof house – Income	0.49	0.000
Waterproof house – Awareness	0.33	0.004
Waterproof house – Land ownership	0.27	0.019
Toilet facility – Drinking water	0.36	0.002
No. of rooms – Toilet facility	–0.23	0.049
No. of rooms – Under scheme	–0.53	0.000
No. of rooms – Living room	0.81	0.000
No. of rooms – Income	0.60	0.000
No. of rooms – Awareness	0.29	0.013
Living room – Kitchen	–0.38	0.001
Living room – Electricity	0.31	0.007
Living room – Income	0.58	0.000
Living room – Awareness	0.29	0.012
Electricity – Income	0.35	0.002
Income – Awareness	0.50	0.000

Source: Author's Estimation

Stata was used to find the Pearson's correlation coefficients that were used to figure out the strength and direction of the relationships between important housing and infrastructure factors. The associations shown in the table are only the ones that had a p-value less than 0.05, which means they were statistically significant. This approach ensures that the connections observed aren't random, and they can be understood within the context of PVTG groups that lack of infrastructure. The correlation results highlight several important dimensions of infrastructural inequality. A clear trend emerges in which households with greater structural adequacy (e.g., more pucca rooms or waterproof construction) are linked to improved economic and informational resources, as seen in their positive association with income and awareness levels. with consistent positive correlations with a number of variables, such as income, awareness, and living rooms, and a negative correlation with reliance on government housing programs, the number of rooms emerges as a powerful proxy for overall household welfare.

Inconsistent correlations between fundamental amenities such as access to drinking water and toilets and the structural integrity of homes are indicative of continuous deficiencies in the provision of sanitation services. The fact that homes with defined living areas and greater incomes are more likely to have access to electricity, which is commonly considered to be provided uniformly, is more proof of the economic discrepancy that exists in the distribution of utilities. There is a moderate but considerable correlation between land ownership and housing quality indicators, which further strengthens the connection between tenure security and investment in infrastructure. Taking everything into consideration, these findings highlight the

interconnected but uneven nature of infrastructure access. Improvements in one dimension (for example, income or landholding) tend to influence several others, which suggests that multidimensional strategies are essential for closing the development gaps that PVTGs are currently facing.

6.3 Rotated factor loadings from factor analysis

The table below presents the rotated factor loadings (≥ |0.4|) grouped under two latent dimensions identified using Principal Factor Analysis.

Table 3: Rotated factor loadings

Variable	Factor 1: Housing & Economic Well-being	Factor 2: Indoor Infrastructure & Utilities
No. of pucca rooms	0.80	
Waterproof house	0.85	
No. of rooms	0.86	
Living room	0.70	0.63
Annual income	0.69	
Level of awareness	0.43	
Kitchen		-0.81
Electricity		0.42
Drinking water		0.42

Source: Author's Estimation

Two underlying dimensions are revealed by the rotated factor loadings from the Principal Factor

Analysis

Variables associated with the structural character of housing and economic status are captured by Factor 1: Housing & Economic Well-being. This factor is indicative of the overall housing adequacy, as well as economic and informational well-being, as indicated by the high loadings on the number of pucca rooms (0.80), impermeable house (0.85), total rooms (0.86), presence of living room (0.70), annual income (0.69), and awareness level (0.43).

Key utility-related variables are included in Factor 2: Indoor Infrastructure & Utilities. It is significantly influenced by the presence of a kitchen (-0.81), electricity (0.42), and access to potable water (0.42), suggesting a distinct dimension of indoor functional infrastructure. The negative loading on the kitchen may suggest an inverse association with other utilities, which could be the result of shared or outdoor kitchen arrangements. The multidimensional character of infrastructure deprivation among PVTGs is collectively explained by these two factors, which differentiate between utility access and housing quality.

The table below summarizes the statistical test used to determine the significance of the factor model.

Table 4: Significance of the factor model

Test Name	Chi-square (χ^2)	Degrees of Freedom (df)	p-value
Likelihood Ratio Test (independent vs. saturated)	683.60	78	0.000

Source: Author's Estimation

The factorability of the dataset was verified by the utilization of the likelihood ratio test, which resulted in a Chi-square value of 683.60 (differential frequency = 78, $p < 0.001$). This indicates that the correlation matrix is significantly different from an identity matrix, which indicates that the variables have a considerable amount of variance in common to support the utilization of factor analysis. In addition, variables that exhibited factor loadings that were greater than 0.4 were considered to be statistically significant contributors to their respective factors, under the thresholds that were established following factor analysis. In total, the two factors that were kept accounted for roughly 72 percent of the total variance, which is evidence that the factor solution is adequate.

Conclusion

The purpose of this study is to investigate the situation of Particularly Vulnerable Tribal Groups (PVTGs) in the Latehar district of Jharkhand, as well as the interrelationships between housing, sanitation, landholding, and income pertaining to these groups. The findings point to a landscape that is characterized by unequal access to fundamental infrastructure, as well as considerable differences in the availability and quality of key services within the landscape. Despite the fact that land ownership appeared as the most prominent asset (mean = 6.32), the large variability (standard deviation = 5.47) highlights the unequal distribution of land ownership among households. While access to sanitary facilities such as toilets received a mean score that was reasonably high (3.93), severe deficits continue to exist in terms of access to power (mean = 0.32) and kitchen facilities (mean = 0.34), which indicates that essential functional infrastructure has been neglected. Further insight is provided by the correlation analysis, which offers light on the complex nature of the inequality that is present in the infrastructure. There is a substantial positive link between pucca rooms and waterproof housing (r = 0.94), which shows that dwellings that are structurally sound are more likely to be resistant to the elements. This was demonstrated by the fact that there is a correlation between the two categories. In a similar vein, the number of rooms had a substantial correlation with annual income (r

= 0.60) and awareness (r = 0.29), which further substantiates its usefulness as a proxy for the overall well-being of households. Notably, there was a negative correlation between the availability of toilet facilities and both pucca rooms (r = –0.45) and waterproof housing (r = –0.34), which suggests that there is a disconnect between the ability to access sanitation and the structural sufficiency of the building. In addition, houses constructed through government programs were shown to have a negative correlation with a number of quality measures, such as pucca rooms (r = –0.40) and waterproof housing (r = –0.45). This suggests that there may be problems with the design, targeting, or implementation. Housing and Economic Well-being and Indoor Infrastructure and Utilities were the two latent dimensions that were retrieved through the use of factor analysis. The first element includes structural indicators such as the number of rooms, pucca construction, and income, while the second factor includes access to amenities such as kitchens, power, and water. Both of these factors are considered to be important. These findings provide further evidence that infrastructure deprivation is a multifaceted phenomenon, characterized by the coexistence of impairments in structural quality and access to utilities, as well as the intersection of economic and informational restrictions. These findings bring to light the urgent need for coordinated policy solutions that are tailored to the situation and that address both the physical and functional components of household infrastructure in marginalized tribal communities.

Policy suggestions

The results of this study highlight the importance of adopting a multifaceted and integrated strategy for the development of infrastructure among households that are PVTG. To begin, the negative correlations that were found between government housing schemes and structural variables like pucca rooms (r = –0.40) and waterproof housing (r = –0.45) indicate that there are significant gaps in either the quality of implementation or the targeting of the programs. A full assessment and strengthening of housing programs is required as a result of this. This should include improved beneficiary selection, participatory planning, and design uniformity. Furthermore, the direct clustering of infrastructure variables into two latent factors, one linked to housing quality and the other related to indoor utilities, indicates that interventions must concurrently address both structural adequacy and functional utility access. This is because the two latent factors are related to the same thing. Obtaining land tenure, which can enable households to make long-term investments in infrastructure, is of utmost importance, as evidenced by the moderate yet considerable link that exists between land ownership and housing indices. It was also shown that awareness had a positive correlation with income (r = 0.50) and housing conditions, which indicates that there is a requirement for information, education, and communication (IEC) initiatives that enable communities to effectively demand and utilize services. Therefore, authorities should prioritize the provision of utilities for the most economically and structurally disadvantaged households. This is because access to utilities like as electricity and kitchens is disproportionately provided to households that are economically better situated. Last but not least, because of the high correlation that exists between income and a number of different infrastructure factors, efforts to improve physical infrastructure ought to be tightly linked with livelihood support measures. These measures include the promotion of enterprise, the development of skills, and the incorporation of previously established tribal development programs.

Limitations of the study

There are some limitations to the study that need to be noted, despite the fact that it provides findings that are significant. Due to the inaccessibility of PVTG communities, the sample size was restricted to 75 families. This may hurt the capacity to generalize the findings to the PVTG populations as a whole in other geographical contexts. As a result of the fact that many important variables, such as household income and degree of awareness, are reliant on self-reported data, they are susceptible to being influenced by biases such as social desirability bias and recall bias. Taking into account the fact that the research was carried out utilizing a cross-sectional methodology, it is challenging to make conclusions regarding causality or to track changes over the course of its duration. Furthermore, the analysis does not take into account institutional and administrative characteristics, such as the capacity of local governance, political representation, or bureaucratic efficiency. All of these factors have the potential to play a significant role in determining the outcomes of infrastructure projects, but they are not taken into account in the analysis. Lastly, but certainly not least, the research does not specifically analyze health or nutritional outcomes, despite the fact that it does contain measurements of access to drinking water and sanitation. Having this information would have made it possible to have a more comprehensive knowledge of the ways in which the absence of infrastructure affects well-being.

References

1. Ambagudia, J., & Xaxa, V. (2022). Life of the Marginalised and the Pandemic: The Case of Tribes in India. In Coronasphere (pp. 160-173). Routledge India.
2. Awunyo-Akaba, Y., Awunyo-Akaba, J., Gyapong, M., Senah, K., Konradsen, F., & Rheinländer, T. (2016). Sanitation investments in Ghana: An ethnographic investigation of the role of tenure security, land ownership and livelihoods. BMC Public Health, 16, 1-12.
3. Bhattacharjee, S., Reja, T., Sahoo, S. K., Som, M., Merta, B. R., Saxena, S., ... & Ota, A. B. JibanSampark: Pathways for improving Health and Nutrition among PVTGs in Odisha.
4. Bhoi, N., & Acharya, S. K. (2024). Health status of particularly vulnerable tribal groups (PVTGs) of Odisha: a narrative review. Journal of Health, Population and Nutrition, 43(1), 176.
5. International Institute for Population Sciences (IIPS) & ICF. (2021). *National Family Health Survey (NFHS-5), 2019–21: Jharkhand Fact Sheet*. Mumbai: IIPS.
6. Lakshmi, M. R., & Eswarappa, K. (2024). Quotidian beliefs and practices in maternal and child health care: An empirical study among the Irula tribe of Tamil Nadu. Contemporary Voice of Dalit, 16(3), 280-294.
7. Ministry of Home Affairs. (1962). *Report of the Scheduled Areas and Scheduled Tribes Commission, 1960–61 (Dhebar Commission), Vol. II: Appendices*. Government of India.
8. Ministry of Tribal Affairs. (2023). *Annual Report 2022–23*. Government of India.
9. Ministry of Rural Development. (2023). *Pradhan Mantri Awas Yojana – Gramin (PMAY-G) Dashboard*. Government of India.
10. Ministry of Law and Justice. (2007). *The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006*. Government of India.
11. Ministry of Tribal Affairs. (2023). *Outcome Budget 2023–24*. Government of India.
12. Ministry of Tribal Affairs. (2024). *List of Particularly Vulnerable Tribal Groups (PVTGs)*. Government of India.
13. Ministry of Tribal Affairs. (2024). *Statistical Profile of Scheduled Tribes in India 2024*. Government of India.
14. Office of the Registrar General & Census Commissioner, India. (2011). Census of India 2011: Jharkhand Profile. Government of India.
15. Singh Kharwar, P., Kumar, D., Kumar, A., & Kumar, A. (2024). The State of Housing, Drinking Water, Electricity, and Sanitation Facilities of Scheduled Tribes in Eastern Uttar Pradesh, India. IntechOpen. doi: 10.5772/intechopen.113046
16. Singh, A. K. (2017). Status of Particularly Vulnerable Tribal Groups (PVTGs) in India: Special Reference to the State of Chhattisgarh. Geo Analyst.
17. Singh, J. E., Babshetti, V., & BK, M. (2023). " Socio-Economic Status Of Particularly Vulnerable Tribal Groups (Pvtgs) In Karnataka: A Comprehensive Study". Journal of Namibian Studies, 36.
18. Valencia, L. M. (2021). Uphill Battle: Forest rights and restoration on Podu landscapes in Keonjhar, Odisha. Journal of South Asian Development, 16(3), 342-366.
19. Xaxa, A., & Devy, G. N. (2021). Being Adivasi: Existence, entitlements, exclusion. Penguin Random House India Private Limited.